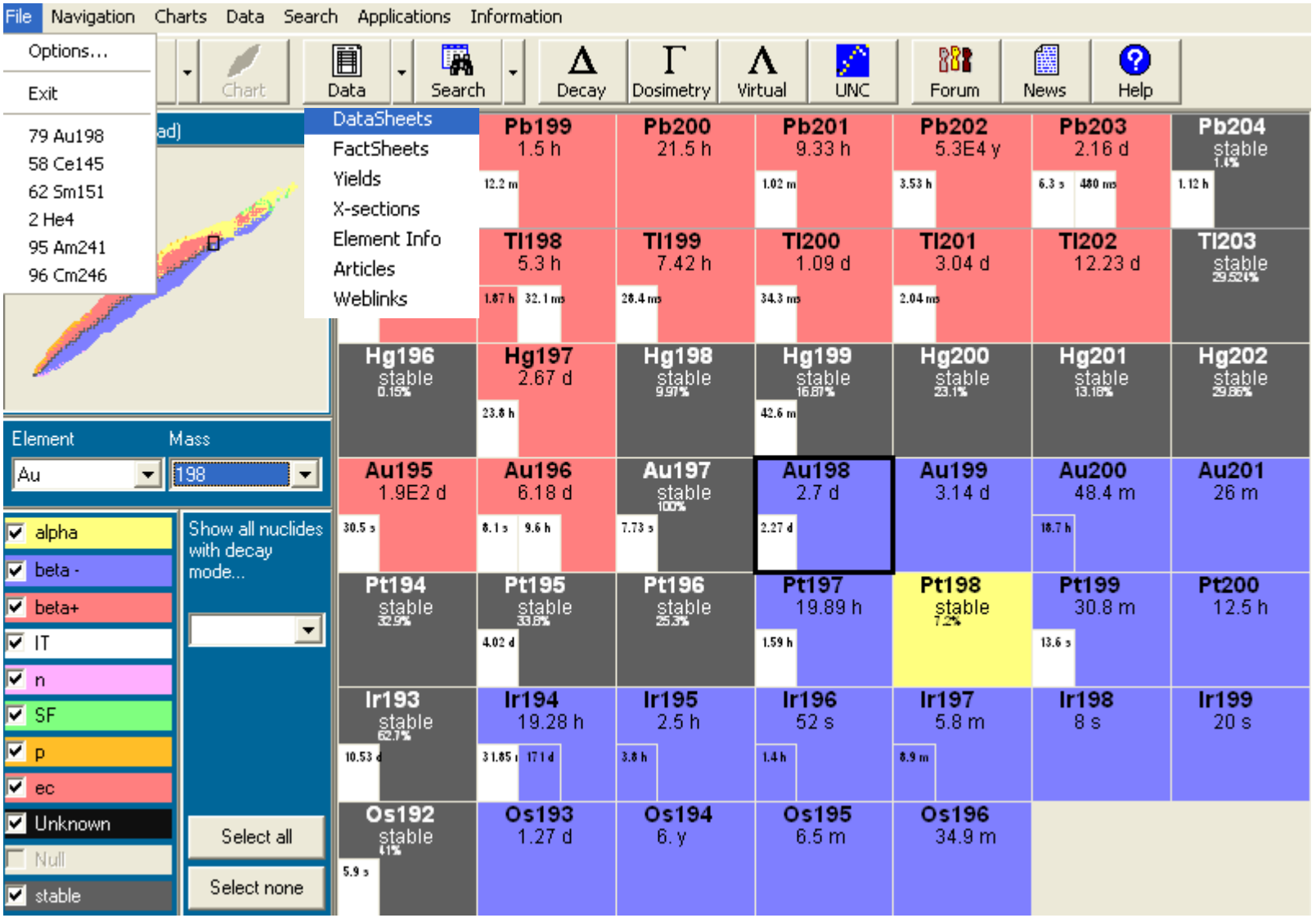
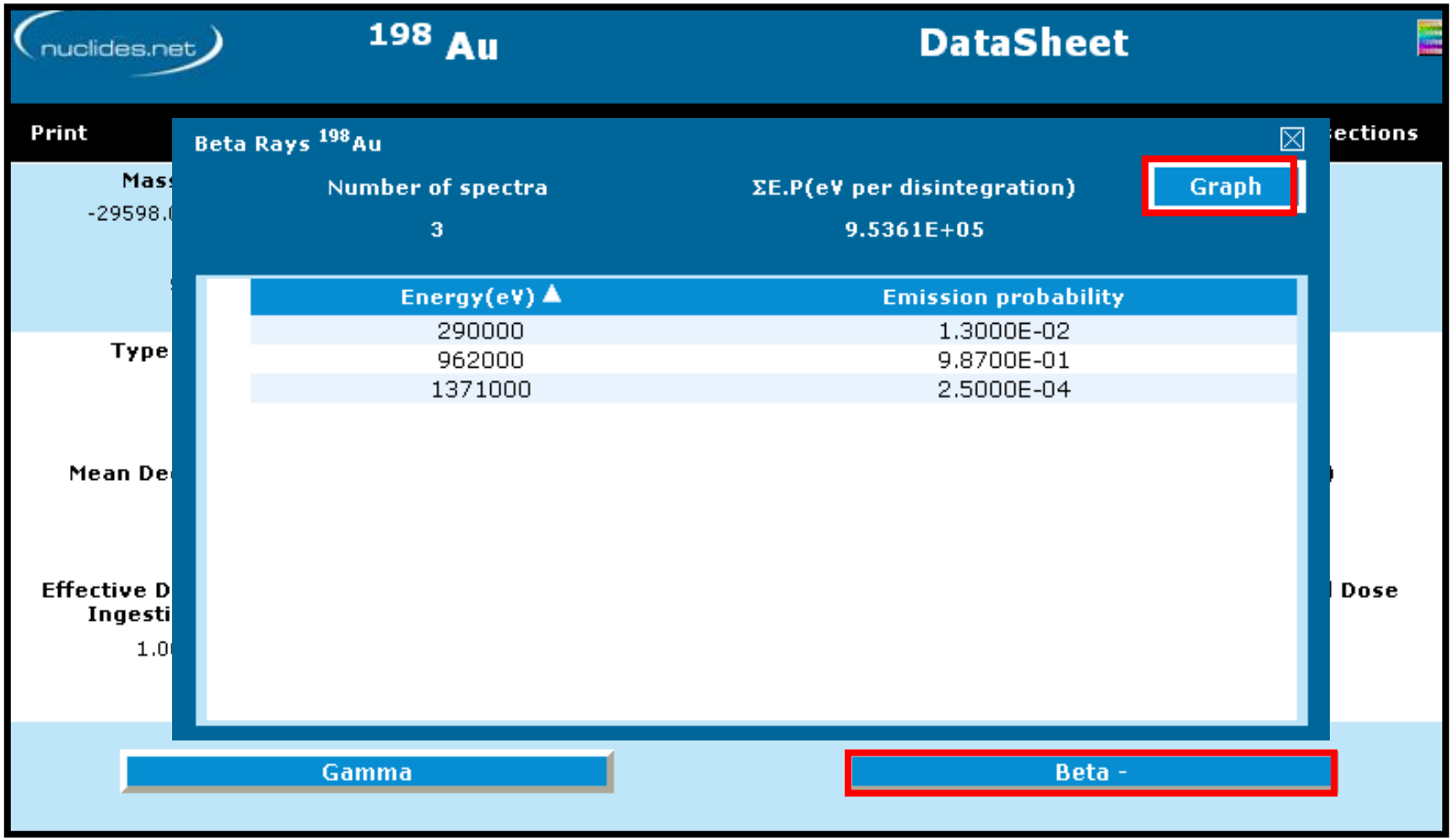
Data Sheets/Facts Sheets/Articles/Web Link

Data Sheets



Data Sheets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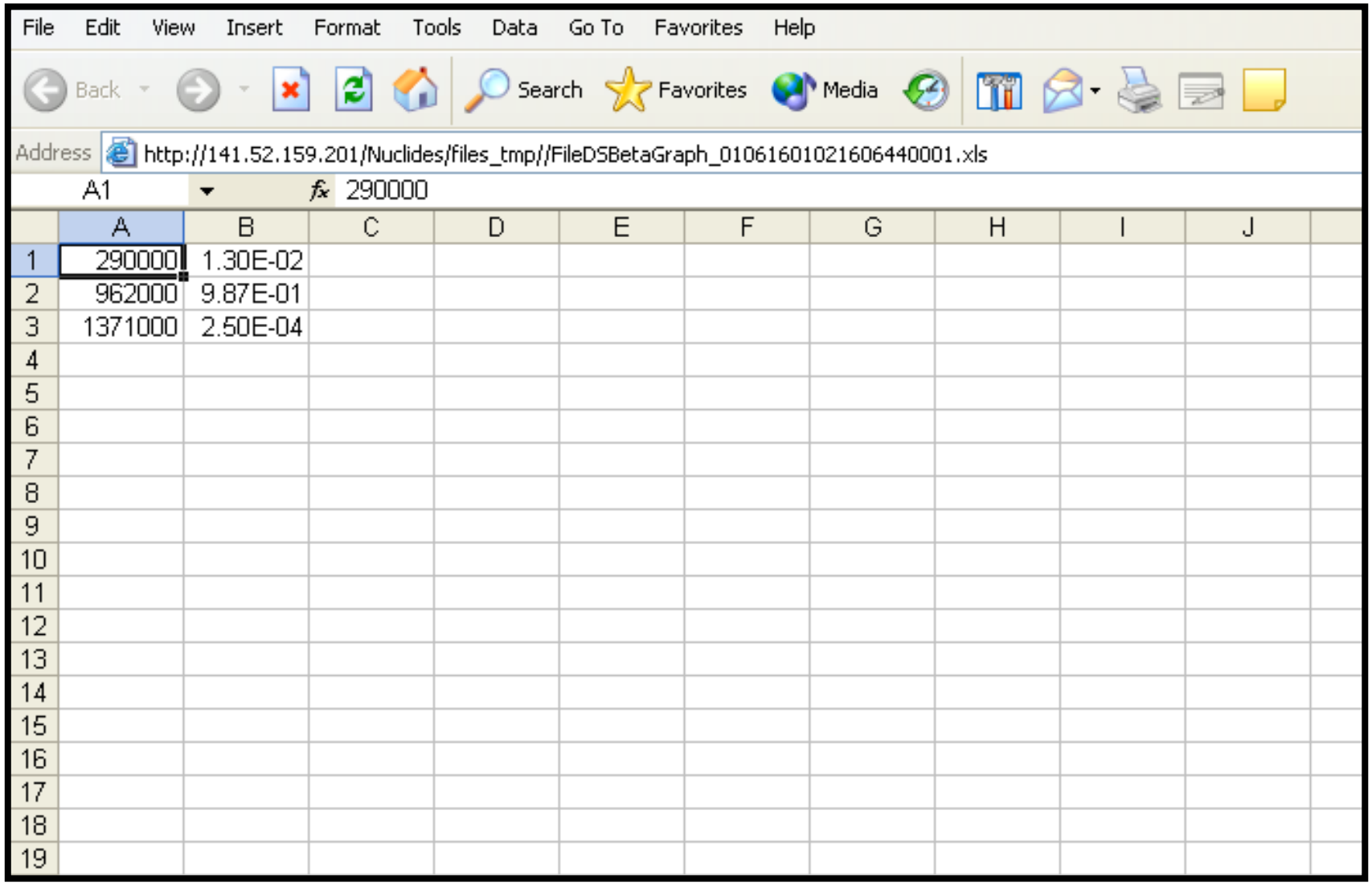
198 Au
DataSheet
Print
Beta Rays 198Au
Number of spectra
3
ΣE.P(eV per disintegration)
9.5361E+05
Graph
Energy(eV)
Emission probability
290000
1.3000E-02
962000
9.8700E-01
1371000
2.5000E-04
Gamma
Beta -

Data Sheets



	A	B	C	D	E	F	G	H	I	J
1	290000	1.30E-02								
2	962000	9.87E-01								
3	1371000	2.50E-04								
4										
5										
6										
7										
8										
9										
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11										
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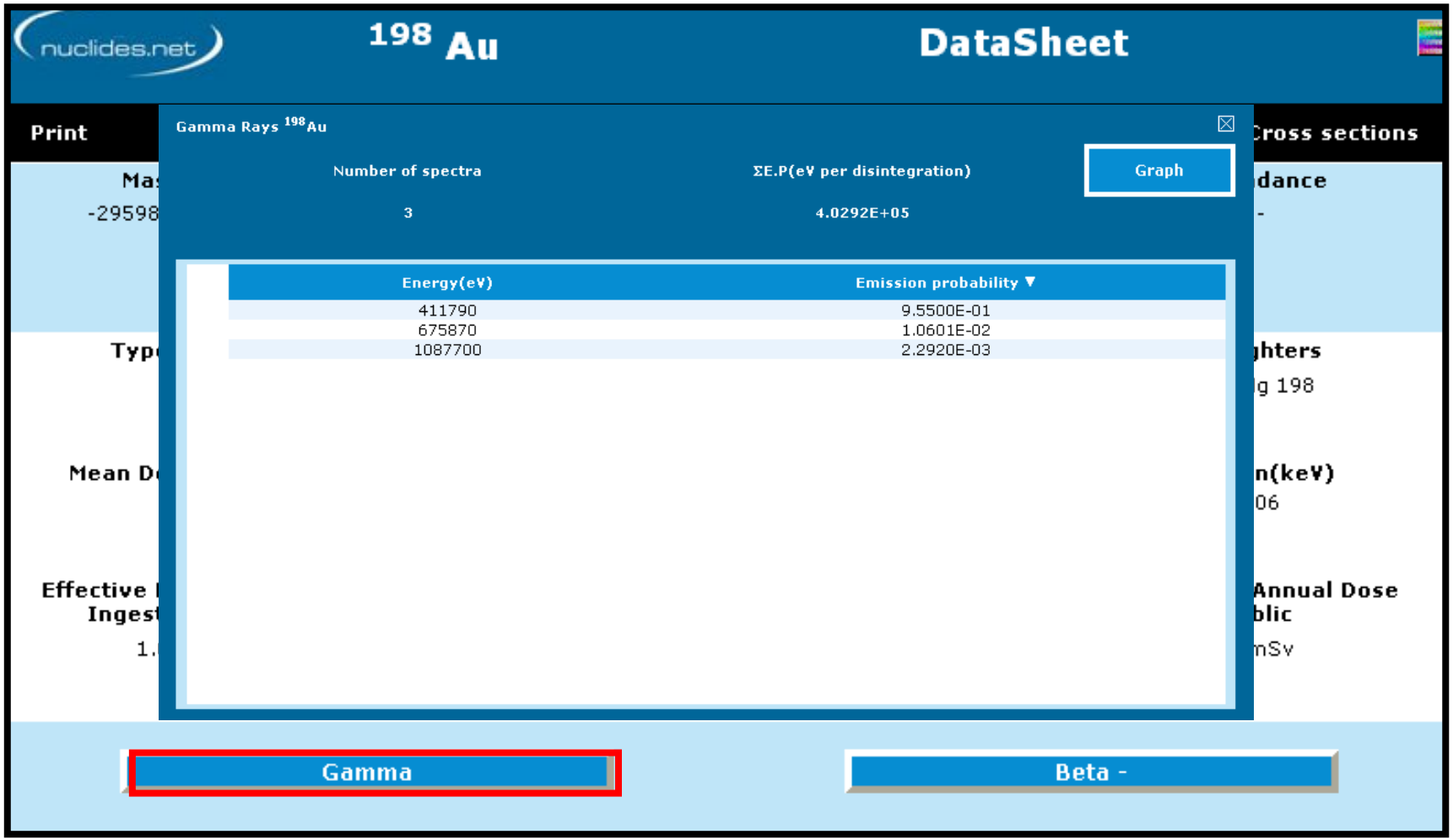
Data Sheets

Data Sheets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198 Au
DataSheet
Print
Cross sections
Gamma Rays 198Au
Number of spectra
3
ΣE.P(eV per disintegration)
4.0292E+05
Graph
Energy(eV)
Emission probability
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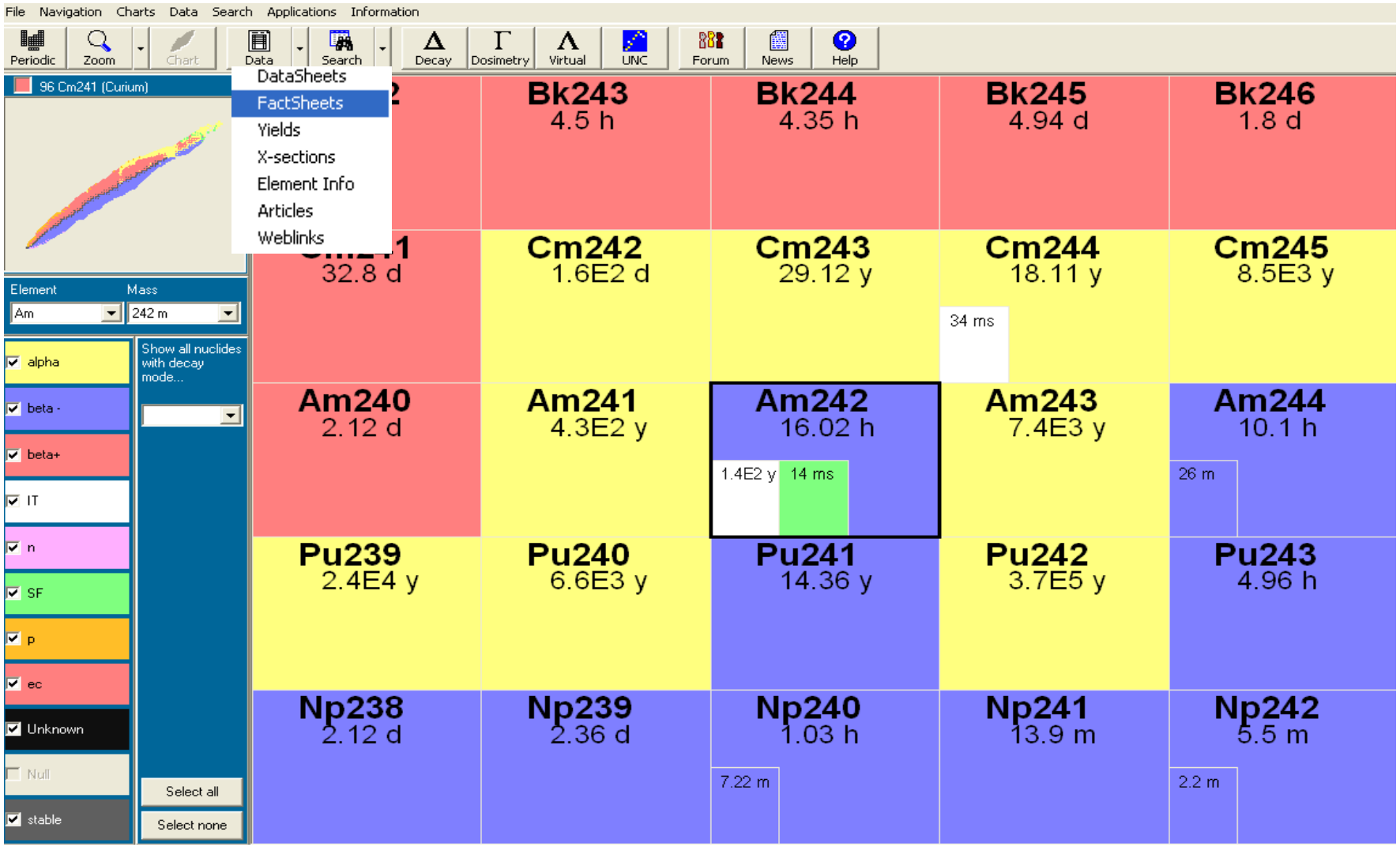
1087700
2.2920E-03
Gamma
Beta -

Fact Sheets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96 Cm241 (Curium)
Element
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Am
242 m
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Unknown
Null
stable
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Select all
Select none
Bk243 4.5 h
Bk244 4.35 h
Bk245 4.94 d
Bk246 1.8 d
Cm242 1.6E2 d
Cm243 29.12 y
Cm244 18.11 y
34 ms
Cm245 8.5E3 y
Am240 2.12 d
Am241 4.3E2 y
Am242 16.02 h
1.4E2 y
14 ms
Am243 7.4E3 y
Am244 10.1 h
26 m
Pu239 2.4E4 y
Pu240 6.6E3 y
Pu241 14.36 y
Pu242 3.7E5 y
Pu243 4.96 h
Np238 2.12 d
Np239 2.36 d
Np240 1.03 h
7.22 m
Np241 13.9 m
Np242 5.5 m
2.2 m

Fact Sheets

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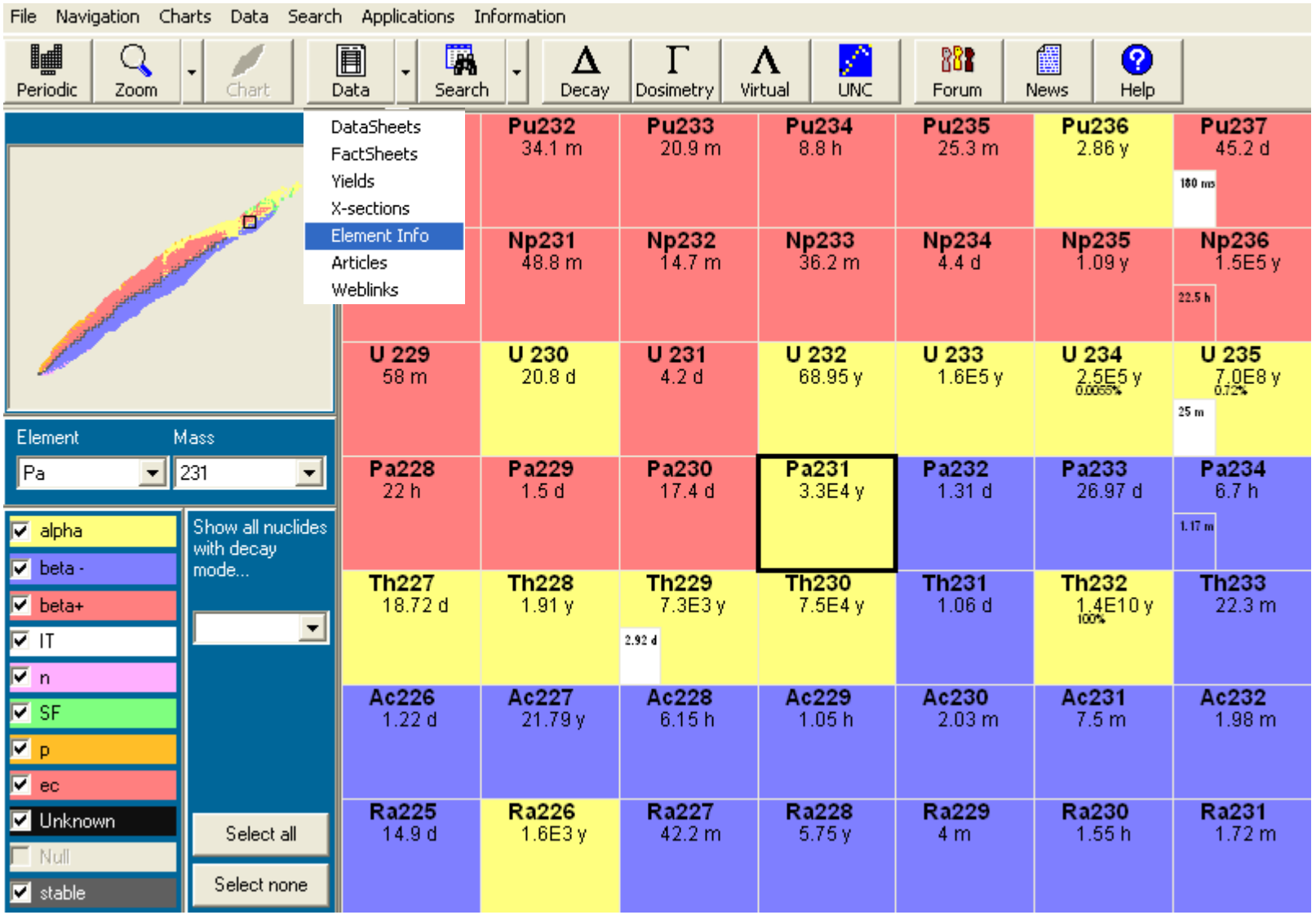
FactSheets

Nuclide : ^{242m} Am

Half-Life =	1.41E+02	y
Average or mean lifetime =	2.03E+02	y
Specific Activity =	3.88E+11	Bq/g
Heat Generation:		
Isotopic Power(α) =	1.57E-03	W/g
Isotopic Power(α+β) =	4.18E-03	W/g
Isotopic Power(α+β+γ) =	4.49E-03	W/g
Neutron Emission:		
Spontaneous Fission Rate =	5.81E+01	$g^{-1}.s^{-1}$
Gamma Emission:		
Specific Gamma Dose Rate at 1m.=	1.02E-01	µSv/MBq.h
Radiotoxicity:		
Annual Limit of Intake (ALI) for Inhalation* =	5.71E+02	Bq
Annual Limit of Intake (ALI) for Ingestion* =	1.05E+05	Bq
Derived air concentration (DAC)* =	2.38E-01	Bq/m^3
Derived water concentration (DWC)* =	1.15E+02	Bq/litre
Packaging & Transport:		
Activity limits for special form materials, A1 =	10	TBq
Activity limits for normal form materials, A2 =	0.001	TBq
Mass(A1) =	2.58E-11	g
Mass(A2) =	2.58E-15	g

*Based on Reference Annual Dose: 0,02 Sv for workers. For members of the public, the reference annual dose is 1mSv and these numbers should be reduced by a factor 20.

Element Information



Element Information

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Element Information

Protactinium

(Courtesy of the Actinide Group, Institute for Transuranium Elements)

(Gr. *protos*, first). The first isotope of element 91 to be discovered was ^{234}Pa, also known as UX_2, a short-lived member of the naturally occurring ^{238}U decay series. It was identified by K. Fajans and O.H. Gohring in 1913 and the named the new element *brevium*. When the longer-lived isotope ^{231}Pa was identified by Hahn and Meitner in 1918, the name protoactinium was adopted as being more consistent with the characteristics of the most abundant isotope. Soddy, Cranson, and Fleck were also active in this work. The name *protoactinium* was shortened to *protactinium* in 1949. In 1927, Grosse prepared 2 mg of a white powder, which was shown to be Pa_2O_5. Later, in 1934, from 0.1 g of pure Pa_2O_5 he isolated the element by two methods, one of which was by converting the oxide to an iodide and "cracking" it in a high vacuum by an electrically heated filament by the reaction:

$$2PaI_5 \rightarrow 2Pa + 5I_2$$

Protactinium has a bright metallic luster which it retains for some time in air. The element occurs in *pitchblende* to the extent of about 1 part ^{231}Pa to 10 million of ore. Ores from Zaire have about 3 ppm. Protactinium has 20 isotopes, the most common of which is ^{231}Pa with a half-life of 32,700 years. A number of protactinium compounds are known, some of which are colored. The element is superconductive below 1.4K. The element is a dangerous material and requires precautions similar to those used when handling plutonium. In 1959 and 1961, it was announced that the Great Britain Atomic Energy Authority extracted by a 12-stage process 125 g of 99.9% protactinium, the world's only stock of the metal for many years to come. The extraction was made from 60 tons of waste material at a cost of about $500,000. Protactinium is one of the rarest and most expensive naturally occurring elements. The element is an alpha emitter (5.0 MeV) and is a radiological hazard similar to polonium.

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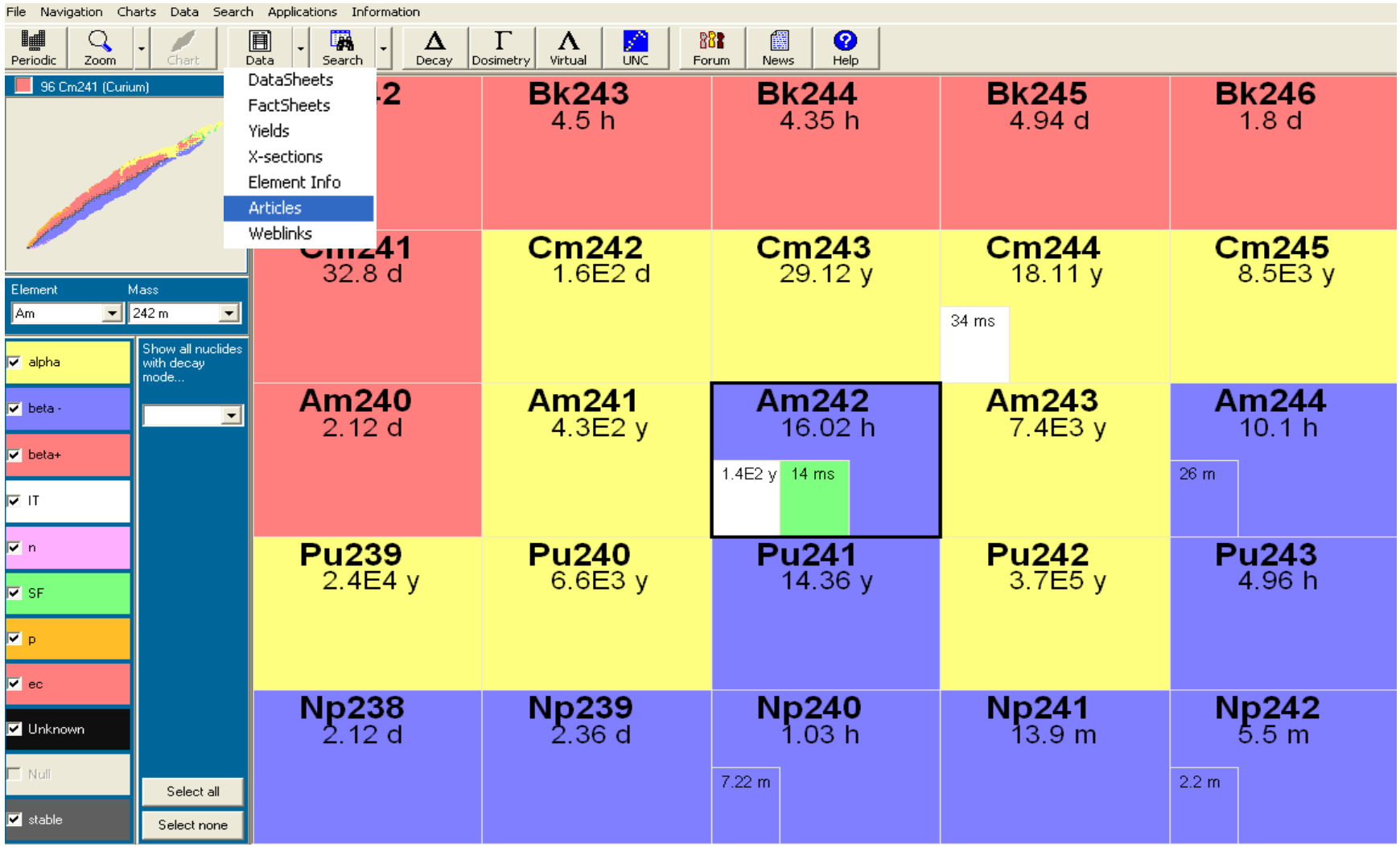
Articles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Np242 5.5 m
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Articles

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Articles

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Another document, a commentary on the Book of Habbakuk (one of the "pesher" mentioned earlier), contains allusions to a prophetic figure called the "Teacher of Righteousness." Some writers have speculated that this literary figure can be associated with Christ. Our radiocarbon age of 2054±22 years BP almost certainly assigns this document to the pre-Christian period, with a calibrated age at 120–5 BC (95 percent confidence). This also demonstrates the achievable precision of such work. The Dead Sea Scroll measurements were done with precision in radiocarbon age of as little as ±20 years, which are some of the best measurements ever made by AMS ^{14}C dating. Our results are reported in two papers (Jull et al., 1995) for those interested in more detail.

Asian Textiles

Another application of AMS to the dating of artistic works has been to a large number of Asian textiles, particularly silks. Most of the samples we have studied originated either from museums or from art dealers. Many of the materials appear on the market from time to time, sometimes from unidentified sources. It has become critical to buyers of such textiles that they know the age of the material. Dating silk can be problematical, as cleaning the material is very important. We have adopted a series of sequential solvent extractions in addition to the standard acid-base-acid pretreatment for silk samples. Some of the silks dated are very well preserved and quite beautiful in appearance.

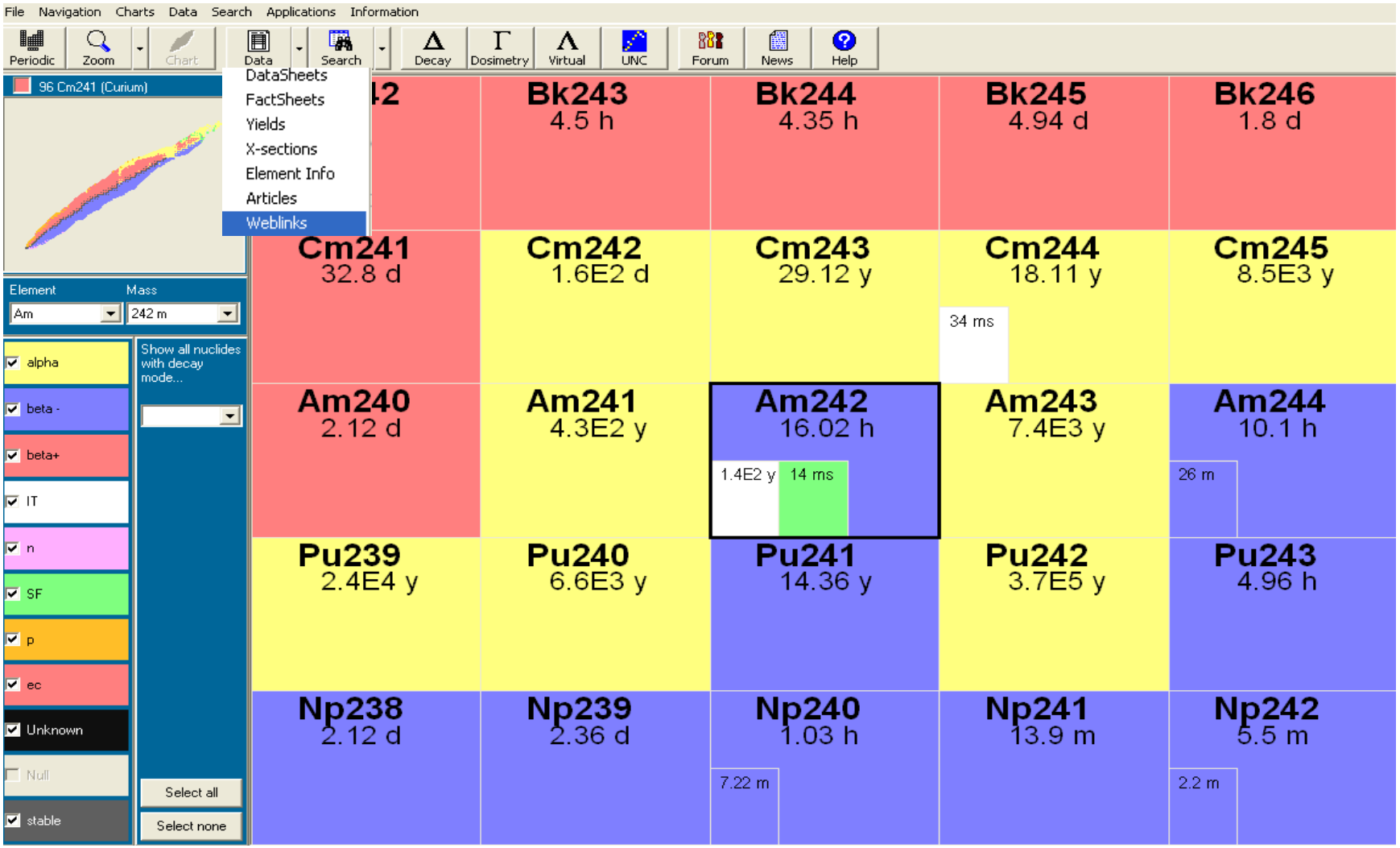
Figure 10 shows a 16th century Indian textile that we dated on behalf of a commercial client. This textile, showing elephants, was dated to 1440–1650 AD (95 percent confidence). Two other examples are also shown. Figure 11 shows a blue embroidered robe collar with birds in flight.This material was expected to be Yuan dynasty (1279–1368 AD). Our 95 percent confidence calibrated age for this sample was 1328–1454 AD. We have also applied our methods with great success to other textiles, rugs, and carpets.

Wooden materials

Dating of wooden materials such as statues, furniture, tools, and other implements can also be carried out using AMS methods. An example of an earlier measurement by our laboratory (Fig. 12) is shown as an example. In the case of wooden artifacts, the age of the wood may add to the apparent age of the object. For example, if someone were to make a statue from a tree which had 100 years of tree rings, the age of the older wood might give an apparent age older than the actual time of fabrication. This problem can be minimised by taking several samples from opposite ends of the wood.

Forgeries

Web Link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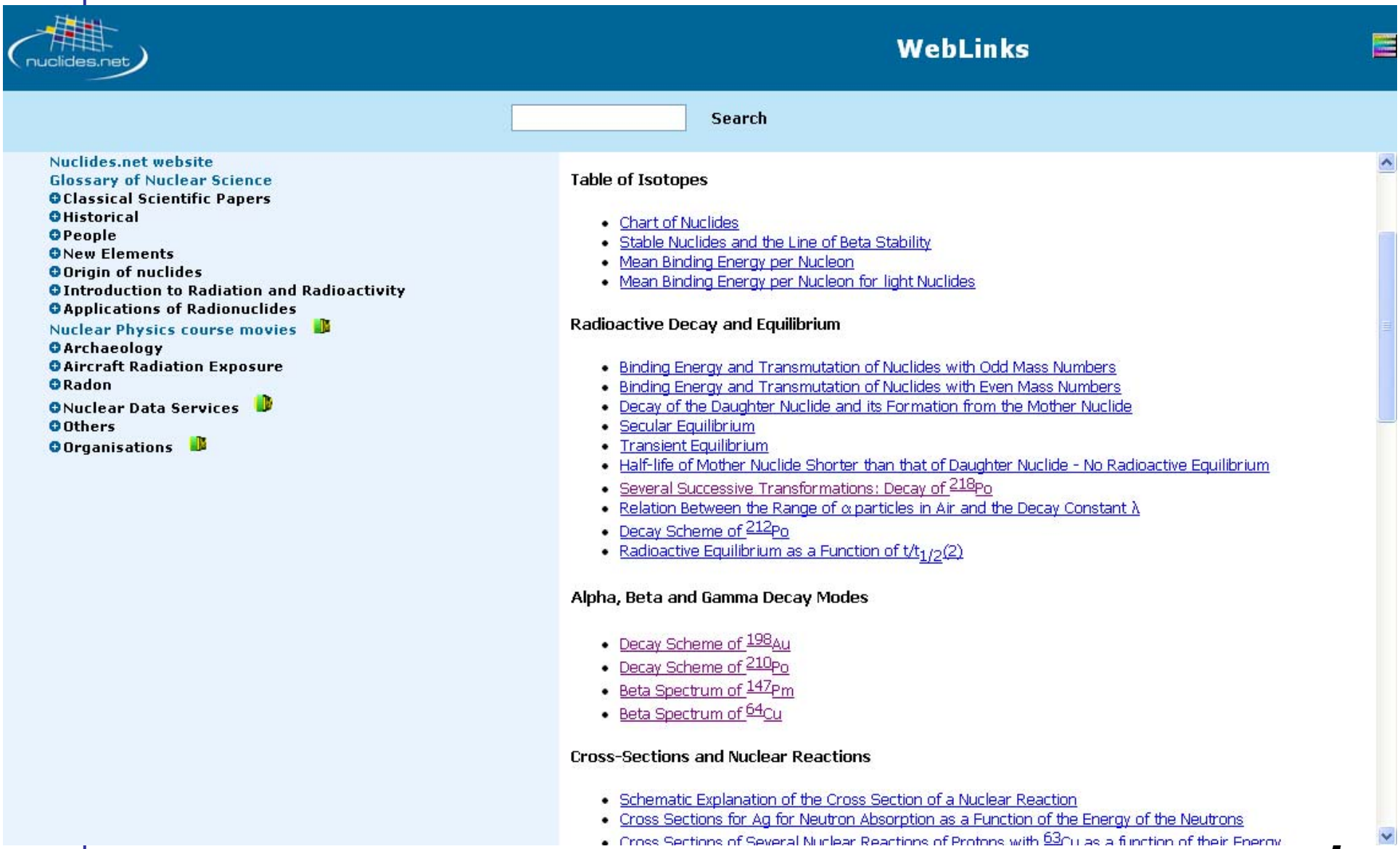
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Binding Energy and Transmutation of Nuclides with Even Mass Numbers
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Transient Equilibrium
Half-life of Mother Nuclide Shorter than that of Daughter Nuclide - No Radioactive Equilibrium
Several Successive Transformations: Decay of 218Po
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Decay Scheme of 212Po
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Beta Spectrum of 64Cu
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Cross Sections for Ag for Neutron Absorption as a Function of the Energy of the Neutrons